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**Title** : Direct Simulation of Turbulent  
Channel Flow

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**Abstract** : Turbulent Channel flow will be simulated directly by solving the Navier-Stokes equations by a finite difference time marching technique. The flow is 3-dimensional and time dependent even though it should turn out to be 2-dimensional and steady in the mean. No slip boundary conditions will be applied on the channel walls and periodic boundary conditions in the other two directions. No adhoc assumptions regarding turbulence modelling or closure of the equations need be made.

It has been understood generally by Computational Fluid Dynamicists that for direct simulation of turbulence on the computer the grid used should be fine enough to resolve the smallest size eddies. However, some recent numerical simulations using a relatively crude grid appear to be surprisingly good. Also the developments in the speed and memory of computers open up new possibilities and make such attempts attractive.

We propose to simulate channel flow upto a Reynolds number of 20,000, take a critical look at the numerical scheme and the detailed flow statistics obtained and explore the possibilities of extending the computations to higher Reynolds numbers. We also propose to parallelize the computer code and run it on FLOLSOLVER - the NAL parallel computer.